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ABSTRACT

Increasing energy dependency, high energy prices, and depleting energy sources have necessitated review of the nature of U.S. energy--who owns it; how we manage it; how and why we consume it; and what should be done about these patterns. Given the power wielded by the oil companies, the pressure of the national standard of living, and the lack of concentrated populations, rural areas are rendered especially vulnerable. But it is the nature of agricultural production patterns coupled with consumption patterns which best illustrate American energy vulnerability. When assessed in caloric terms, agricultural production and agricultural consumption are extremely expensive. The average American consumes approximately 3,300 calories and nearly 100 grams of protein a day which requires an additional 10,017 calories for production, making the U.S. daily caloric outlay 9,000 more than that of an East Indian who expands only 763 additional calories to produce 1,990 calories per day. Comprehensive reform should include a single National Office of Energy Research and Planning; public ownership of oil companies; funding at both State and Federal levels for alternative energy sources; consumer participation in nonprofit energy cooperatives; Federal programs; nationwide conservation and development of a learner lifestyle; and agricultural reforms to promote energy efficiency. (JC)

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"...and he gave it for his opinion, that whoever could make two ears of corn, or two blades of grass, to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country than the whole race of politicians put together."

Jonathan Swift
Gulliver's Travels

ENERGY AND RURAL PEOPLE AND AGRICULTURE

It has only been in the last couple of years that we have begun to realize that we rely upon enormous quantities of energy for everything we do. Rural America used to rely upon the energy generated by the strain of a farmer's back, or his work animals. But in the decades since the last depression we have become almost imperceptively reliant upon energy generated not through the sweat of a worker's brow, but generated by electrical turbines and the burning of fossil fuels. Many of us took for granted the perpetual availability of fuel, and energy, at what we thought were acceptable prices.

Price of fuel and fuel related products has been a cause for concern for rural Americans for years. Many a grower has had to forego the purchase and application of the newest fertilizers. They simply cost too much. Fuel prices dictate the once weekly trip to town. It saves on fuel. So do wood stoves and extra comforters.

Beginning in late 1973, we have all been startled by the dramatic increase in fuel, fertilizer and electricity prices. For the first time the vast majority of Rural Americans are feeling the financial pain of their reliance on energy. It is a pain that the poor have felt in the past and feel even more acutely today.

A major contributor to this price increase was the near tripling of oil prices by the Organization of Petroleum Exporting Countries (OPEC) in October of 1973. Correspondingly, derivative oil products such as fertilizer and pesticides rose in price.

The initial shock of these increases in oil and oil products was most immediately felt in those nations with a minimum of foreign exchange and a reliance upon fuel and fertilizer for their basic needs. Those nations were primarily the less-developed-countries (LDC) where fuel and fertilizer means the difference, sometimes, between starvation and a marginal existence.

In the Punjab region of India, an area which produces nearly 60% of the grain for India's cities, farmers usually make three fertilizer applications. With prices up by as much as 400%, they were able to afford only one application this past year. That is reflected immediately in harvest short-falls. It means less food for a burgeoning population.

While the most devastating impact of high prices and potentially limited energy availability will be in the LDC's, there have, and will continue to be, serious energy problems in this country. They will be most crucial in agricultural areas and among this nation's poor.

It is in this context that we have begun to review the nature of our energy; who owns it; how we manage it; how and why we consume it; and what, if anything, should be done to change these patterns and attempt to avoid the havoc many of us anticipate if we continue our current methods.

THE ENERGY INDUSTRY

The oil industry is one primary example of the power that can be wielded by concentrations of natural and financial resources. It is their marketing practices and our lifestyles which contribute to our America's consumption each year of one-third of the world's annual energy use.

The structure of the oil industry is like the proverbial seamless web. It is composed of interconnecting networks from which there appears to be no escape. They include vertical integrated enterprises where one company is engaged in every aspect of oil discovery, drilling, production, distribution and retailing, and interlocking directorates, where the same people sit on the boards and in the corporate offices of several companies. They may influence policy in a wide range of areas -- banking, steel and automobile manufacturing, and gas and oil production. Cartels and joint ventures, such as the enterprises mining the black gold on Alaska's North Slope, and oil shale from the Northern Plains, and Aramco, the Arabian-American Oil Company, pool resources in order to engage in their mammoth activities. The result: over fifty percent of the oil business is controlled by fewer than a dozen giant companies. 1/

The catalogue of abuses which we are beginning to see laid at the door of large oil companies helps to explain some of the recent price increases. Charges of profiteering during the peak of the "Oil Crisis" are being filed against the giant companies. Energy

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1/ The Energy Cartel: Big Oil vs. The Public Interest, Marine Engineers Beneficial Association, AFL-CIO, February, 1975.

price and availability have been manipulated for the short term gain of a few. Meanwhile, billions of people have suffered.

RURAL AMERICA AND ENERGY

In Rural America, energy is required for all of those activities that we now perceive as essential to a high quality of life. Most of the country is electrified. Gadgets have replaced human effort and ingenuity. Rural transportation systems have a high cost per passenger mile traveled -- largely because of the demographic realities of the countryside. There is no mass to use a mass transit. It costs more to heat many single family rural homes than it does the urban families' apartment. In several ways rising energy prices may hurt more in rural areas than in the city.

It remains, however, that the primary consumer of energy in Rural America, is agriculture. In its aggregate terms, agriculture only consumes some 3% of the total United States energy. All of Rural America may consume 12% of the nation's energy. It is often argued, therefore, that agriculture is insignificant in the nation's total energy picture. There are, however, a number of ways of looking at agriculture and energy. Cast in a different light, the rural and agricultural energy problem may not be so insignificant as those aggregate numbers would lead one to believe.

ENERGY AND THE UNITED STATES FOOD SYSTEM

During the decades since World War II, agriculture has become a much larger consumer of fuel and fuel-related products. According to studies made by Barry Commoner at Washington University, the use of nitrogen fertilizers and pesticides increased 534% and 217% respectively in the years 1946 to 1968. 1/ These increases are not a part of the Green Revolution, which really only began to accelerate in its application in the last years of the 1960's. Rather, the increases in energy intensive agriculture have come about for other, more complex reasons.

For the last three decades, energy has been abundant and cheap. The price of land and the cost of bringing new land into production has been so great that it was cheaper to increase the purchase of fertilizer, pesticides and modern machinery. Additionally, agriculture has never had to internalize the cost of environmental waste and farm labor displacement. Hence, energy inputs were a cheaper way of increasing yields....and for the short term...profits. As two experts recently wrote:

1/ The Vulnerability of Crop Production to Energy Problems, Barry Commoner, et. al., Center for the Biology of Natural Systems, Washington University, St. Louis. January, 1975.

> While U.S. farm output from 1940 to 1972 increased nearly 90 percent on essentially the same acreage, farm labor inputs fell by two-thirds. During the same period fertilizer use on U.S. farms increased almost ninefold, and mechanical power and machinery input grew by 237 percent. 1/

Many of us have been lead to believe that the only way we could possibly feed the world's growing population was through the expanded use of "high-yield, Green Revolution" technologies. In terms of energy use and efficiency, however, that is a dubious possibility. Agricultural Economist David Pimental of Cornell has estimated that if we were to expand our agricultural technologies throughout the world -- and feed the world at our rate of consumption -- we would run out of known fossil fuel reserves in 29 years. 2/ Two other authorities, the Steinhart brothers, calculate that 80% of the world's annual energy expenditure would be required to feed the entire world with an American food system. 3/

While one can argue with the Pimental and Steinhart statistics, it is useful to consider the energy cost of our agriculture, not just in terms of the fuel and fertilizer we put into it, but also in terms of the energy it provides for us. It is figures like these which give us the necessary pause to reflect on where we are going with our energy-intensive agriculture.

CALORIES IN VERSUS CALORIES OUT

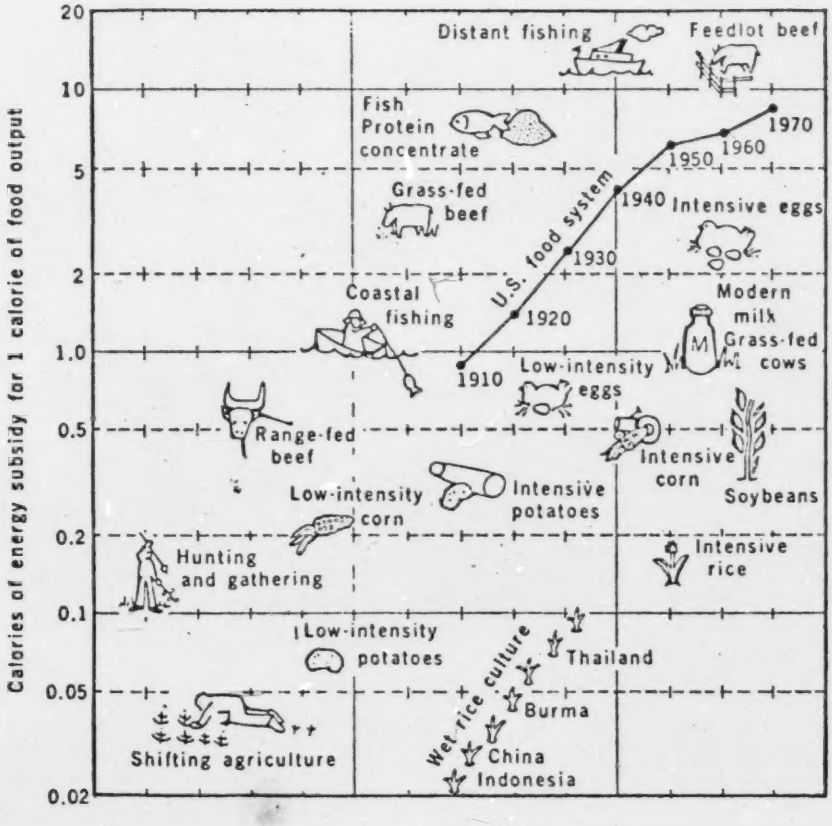
One of the most interesting methods of assessing American agriculture is to calculate its yield in energy terms. The basic energy unit, when we speak of food for human consumption, is the calorie. Agricultural production, when assessed in caloric terms, indicates in a dramatic fashion, the energy-intensive quality of its yield. For example, it requires approximately ten calories of input to generate one calorie of output from feedlot beef. Range-fed beef generate two calories output for each calorie of input.

1/ "Some Impacts of the Changing Energy Situation on U.S. Agriculture," Harold O. Carter and James G. Youde, American Journal of Agricultural Economics, December, 1974, page. 882.

2/ Cited in "U.S. agriculture is growing trouble as well as crops." Wilson Clark, Smithsonian Magazine, November, 1974, pp. 64-64.

3/ "Energy Use in the U.S. Food System," John S. and Carol E. Steinhart, Science, April 19, 1974, p. 312.

The following chart indicates the yields for various commodities.



Energy subsidies for various food crops. The energy history of the United States food system is shown for comparison. 1/

As the Steinhart's write,

> The message...is simple. In 'primitive' cultures, 5 to 50 food calories were obtained for each calorie of energy invested. Some highly civilized cultures have done as well and occasionally better. In sharp contrast, industrialized food systems require 5 to 10 calories of fuel to obtain 1 food calorie. We must pay attention to this difference -- especially if energy costs increase. 2/

1/ Ibid.

2/ Ibid., p. 313.

Similarly, we must pay attention to the calories and to the protein we consume. While many millions of Americans, both rural and urban, must struggle to obtain enough food for themselves and their families, the "average American" consumes food at a prodigious rate. Not only are we gluttonness with energy, we are gluttonness consumers of food as well. The average American consumes approximately 3300 calories and nearly 100 grams of protein per day. Meanwhile,the average need is considerably less -- perhaps 800 calories and 30 to 40 grams fewer of protein should be consumed. The price we pay for this consumption is high. It includes cardio-vascular problems and obesity.

As a people, we consume on the average 2000 pounds of grain a year. Most of that is consumed indirectly in the form of animal protein. Only 125 to 150 pounds is consumed directly in the form of bread and cereal products. The inhabitant of India or China meanwhile, consumes only some 400 pounds of grain a year. Most of that is consumed directly, a little over a pound a day; eaten in a desperate attempt to sustain life. Professor Georg Borgstrom of Michigan State University says, in regard to this situation, "The livestock of the rich world is in direct competition with the humans of the poor world." 1/

As the Steinhart chart indicates, there are more efficient ways to produce food. Their statistics are buttressed by Frances Lappé in her book, Diet for a Small Planet. She indicates that an acre of cereal can produce five times as much protein as an acre devoted to meat production; legumes, ten times as much, and leafy vegetables twenty times as much protein as meat. 2/

Followed full circle, Professor Borgstrom calculates that in terms of calories, U.S. consumption is phenomenal when compared to that of the LDC's. While we consume an average 3300 calories per person per day, it takes an additional 10,017 calories to produce that amount of food. The Indian who consumes 1,990 calories, expends only 763 additional calories to generate his food. Per capita daily calorie outlay in the U.S. is, therefore, over 9,000 calories more than in India. 3/

It is important to realize, however, that the greatest contributor to food energy costs come in the farm to market part of the food chain. As many as 25 to 30 calories are required to get 1 calorie of food to our tables. Consequently, the greatest savings

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1/ Cited in "U.S. agriculture is growing trouble", supra. p. 61.

2/ Diet for a Small Planet, Frances Moore Lappé, Ballantine, 1971.

3/ Cited in "U.S. agriculture is growing trouble" supra.

can probably be obtained off of the farm -- in the processing, distribution and marketing end of the food chain. 1/

As British economist E. F. Schumacher said in a recent speech, it is absurd for Kansas wheat to be shipped to Seattle for a milling and processing into a cereal of inferior nutrient worth and then shipped to Boston where it is consumed for breakfast. 2/

So, energy works many different ways in rural America. It costs money. It is valuable and in short supply. Yet we seem to have devised the most ingenious system for wasting it. The very structure of much of our economy relies upon that waste....in fact, it encourages the waste.

It is possible that the natural forces of the market place -- in the form of rising energy prices -- may cause some of the waste and maldistribution of energy to abate. But, before that happens, there are many people, especially the rural poor, whose meager budgets are already consumed by the purchase of the necessities of life. One can only envision more horror stories of the elderly poor freezing to death from the lack of heating oil if the current trends continue - that is, if they don't starve to death first.

GOVERNMENTAL ACTIVITY

State and local government have been considerably more innovative than their Federal counterparts in conservation, recycling programs and energy planning activities. Perhaps the most promising work has been undertaken in Oregon through the Office of Energy Research and Planning in the Office of the Governor. In a program committed to asking people and the Earth first, an energy-based decision making program is being developed. The state is planning a system which will consider the impact on people's lives and on the states' resources before a decision to go ahead is given. If early indications are any example, it is a system which should be duplicated nationwide.

PROPOSALS FOR REFORM

Any proposal for reform of the energy problems this nation faces must be comprehensive. And they must be coordinated. For too long we have attacked problems with categorical programs which disregard the side-effects of their so-called solutions. In the

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1/ "Some Impacts of the Changing Energy Situation" supra. p. 881.

2/ See generally Schumacher's Small is Beautiful, Economics as if People Mattered. Harper and Row, 1974.

preceding pages, which are only the briefest overview of some of the aspects of the energy problems rural Americans face, it is obvious that the matter is complex and not given to simple solutions.

Our reforms might take the following direction:

FIRST, There must be one National Office of Energy Research and Planning. It must be the final arbiter of national policy planning in energy. In its role as the national energy planning body, such a body would have veto power over the decisions of other Federal agencies. It would have a long range planning function, and insofar as possible, it would attempt to gauge the impact of national energy activities before the damage is done. It might initiate "Energy Decision-making Impact Statements."

SECOND, Through the combined efforts of the appropriate Federal Regulatory Agencies and the Congress, work must progress on the dismantling of the large oil and energy companies. Fuel, both in the form of oil, and electrical power, is too important to be left to the whim of private enterprise. Public ownership of these large corporations would remove them from the powerful position they have in national policy formulation. As Marcus Raskin recently suggested, the chief executive officers of the largest companies exercise more power than many of the world's head's of state. Perhaps they should be elected by the public at large.

THIRD, State and Federal agencies with responsibility for energy research and development should spend the preponderate amount of their funding on the search for viable alternative sources. Geothermal, solar, and wind energy are all of great potential in rural America. There are several thousand windmills which could be rehabilitated -- perhaps by the Rural Electrification Administration.

FOURTH, Public ownership of local utilities and consumer participation in non-profit energy cooperatives should be encouraged and supported by the various levels of government.

FIFTH, Given the government's preference for categorical programs, perhaps it should initiate a Fuel Stamp Program, a Home Insulation Program, a Small Farmer Fuel and Fertilizer Stamp Program and on ad infinitum. More appropriately, some form of income maintenance is required to meet the needs of the rural poor.

SIXTH, A nationwide program of conservation must be initiated. We must encourage the development of a leaner lifestyle. That must include less horsepower, fewer calories, and less animal protein. In fact, the prestigious National Academy of Sciences has recently recommended a 13% reduction in the average American's consumption

of protein. To save energy on the farm to market part of the food chain, we need to alter our consumption patterns away from the highly processed foods. That means eating more whole wheat bread and purchasing fewer ready to eat items. It also means actively pursuing home gardening. We should encourage community gardens. The White House should have its own garden on the South Lawn. That will shorten the energy expended from farm to market.

SEVENTH, A number of agricultural reforms must be actively encouraged. The moderate approach, best elucidated in a recent article in the American Journal of Agricultural Economics by Harold O. Carter and James G. Youde, outlines five steps designed to reduce farm energy use:

1. Improving the energy efficiency of farm machinery by using machines precisely scaled for particular jobs and maintaining them properly.

2. Monitoring of water use more carefully to reduce waste.

3. Designing grain and forage-drying systems to use optimal combinations of solar and artificial heat.

4. Minimizing tillage practices to reduce energy consumption in some cropping systems.

5. Developing plant breeding to emphasize resistance and reduction of pesticide use. Plant efficiency in converting fuel energy to food energy might also be improved. 1/

The reforms suggested by the Steinhart brothers are more agressive. They cite other sources for support of a number of energy reducing ideas in the United States food system. They include:

1) Greater use of natural manures

2) Decentralization of feedlots

3) Increased crop rotation

4) New methods of weed and pest control

- hand-weeding
- "when and where necessary" pesticide application
- biologic pest control
- increase hand application of pesticides
- reduced cosmetic standards for fruit and vegetables.

1/ "Some Impacts of the Changing Energy Situation" supra. p. 882.

5) Abandonment of chemical farming entirely. 1/

At the very least, much more attention needs to be given by governments and universities to alternative forms of producing energy and producing food with non-chemical, labor-intensive methods.

1/ "Energy Use and the U.S. Food System" supra. pp. 313-315.